

Decoding the Age of Presbyopic Revelation: An Investigation into Onset and Influencing Factors

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ABSTRACT

Background: Presbyopia is an age-related decline in near vision due to reduced accommodative ability of the eye. It significantly impacts daily activities, particularly among individuals engaged in near work. Various factors, including occupation, refractive errors, and physical attributes, influence its onset and the frequency of prescription changes for corrective glasses. This study aimed to evaluate the age at which presbyopic glasses are prescribed and the factors influencing the frequency of their replacement.

Methods: This study was conducted between June 2024 and November 2024; this cross-sectional study took place at the outpatient department of ophthalmology at GMC and AH Rajouri. Informed written consent was obtained from all participants. A detailed history of near work was gathered, followed by comprehensive examinations.

Results: Among the participants, males (59%) were predominant compared to females (41%). Occupations such as tailors, teachers, drivers, engineers, and welders demonstrated an early need for presbyopic correction (<40–49 years) and required glasses to be changed more frequently (2–3 times within 10 years). Individuals with shorter stature, lower upper segment: lower segment (US: LS) ratio and hypermetropia were inclined to require presbyopic correction at a younger age and undergo more frequent glasses replacements.

Conclusion: Occupations involving extensive near work, shorter stature, lower US: LS ratio and hypermetropia were linked to an early need for presbyopic correction (age <40 to 49 years). Moreover, factors such as occupations requiring near work, normal to taller stature, lower US: LS ratio, hypermetropia, and the usage of visual display units were associated with increased frequency of glasses replacement.

Key-words: Presbyopia, Presbyopic revelation, Presbyopic correction, Glasses replacement, Hypermetropia

INTRODUCTION

Presbyopia, characterized by changes in eye accommodation that lead to near vision difficulties, is a chronic condition predominantly associated with aging. These changes affect the ciliary muscles, lens, and lens capsule [1,2].

Common signs of presbyopia include blurred vision, difficulty focusing on close objects, and symptoms like ocular discomfort, headaches, and fatigue during near tasks [3,4]. Individuals with occupations involving prolonged near-vision tasks often experience symptoms earlier. Advancements in workplace technologies, such as increased computer usage, can introduce new visual demands [5-7]. Various factors including alcohol consumption, smoking, and even shorter stature have been associated with presbyopia [8-10]. Moreover, uncorrected hypermetropia can exacerbate presbyopia by prematurely increasing accommodative demands [11]. Presbyopic individuals experience heightened visual

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strain and decreased productivity due to the natural decline in accommodation with age. This often results in insufficient correction for intermediate and near vision, crucial for digital device usage, leading to underperformance [12,13]. These multifaceted factors underscore the complexity of managing presbyopia and highlight the importance of comprehensive eye care in addressing its challenges.

Given the increasing reliance on digital screens, the visual demands placed on individuals have evolved significantly. Modern lifestyles require continuous near-vision tasks, from reading and writing to prolonged screen exposure, which further compounds the symptoms of presbyopia. With the global aging population rising, early diagnosis and timely correction are critical to maintaining visual comfort and productivity. Addressing presbyopia effectively requires a multifaceted approach, including optical corrections, ergonomic adjustments, and lifestyle modifications to reduce visual strain.

MATERIALS AND METHODS

Research Design- This hospital-based cross-sectional study was conducted in the outpatient department of ophthalmology at GMC and AH Rajouri between June 2024 and November 2024. The study aimed to evaluate the onset of presbyopia and the factors influencing the frequency of glasses replacement.

Inclusion Criteria

- Patients aged 30 years and above with complaints of near vision difficulty.
- Individuals showing improvement in near vision with convex lenses for presbyopia.
- Patients willing to participate and provide informed written consent.

Exclusion Criteria

- History of intraocular trauma or surgeries.
- Presence of retinal or optic nerve pathologies.
- Diagnosed cases of primary open-angle glaucoma.
- Dense cataracts or ocular conditions affecting near vision.
- Pregnant women.

Data Collection- Demographic information, including age, gender, occupation, height, upper segment to lower segment (US: LS) ratio, arm length, substance use

(tobacco and alcohol), visual display unit (VDU) usage, and preexisting refractive status, was recorded. A history of spectacle changes over the past 10 years was also documented.

Ocular Examination

Visual Acuity Assessment- Distant and near vision was assessed using Snellen's charts.

Refraction Tests- Both objective and subjective refraction were performed, with near vision correction following distance correction.

Anterior Segment Evaluation- A slit lamp examination was conducted.

Intraocular Pressure Measurement- Non-contact tonometry was used.

Posterior Segment Examination- Conducted through indirect ophthalmoscopy and slit-lamp biomicroscopy.

Statistical Analysis- Categorical data were presented as frequencies and percentages, while quantitative data were expressed as means. The Chi-square test was used to determine statistical significance, with $p < 0.05$ considered significant.

Ethical Approval- The study received ethical clearance from the institutional review board. Written informed consent was obtained from all participants before enrollment, ensuring adherence to ethical guidelines. There were no financial conflicts of interest.

RESULTS

This study included 600 presbyopic patients, with a higher prevalence among males (59%) than females (41%). The mean age of participants was 48.31 years, with 6% ($n=36$) exhibiting premature presbyopia before the age of 40 years. Most cases (53%) fell within the 40–49 years age group, followed by 37% in the 50–59 years group and 4% in those aged ≥ 60 years (Table 1).

Table 1: Demographic Characteristics of Presbyopic Patients

Parameter	Value
Total Patients	600
Male Patients (%)	354 (59%)
Female Patients (%)	246 (41%)
Mean Age (years)	48.31

Premature Presbyopia (<40 years)	36 (6%)
Age Groups	
- <40 years	36 (6%)
- 40–49 years	318 (53%)
- 50–59 years	222 (37%)
- ≥60 years	24 (4%)

Occupational distribution indicated that individuals engaged in near work, such as tailors, engineers, and teachers, were more likely to experience premature presbyopia. Homemakers, farmers, and drivers constituted a significant proportion of presbyopes in later age groups (Table 2).

Table 2: Occupation Distribution of Presbyopic Patients

Occupation	Patients in Respective Age Groups	
	<40 years	
Homemakers	-	
Tailors	5	
Engineers	5	
Teachers	2	
Farmers	-	
Drivers	-	
Businessmen	-	
Accountants	-	
Others	24	

Anthropometric parameters showed an average height of 161.59 cm, a mean arm length of 59.67 cm, and a mean upper segment to lower segment (US: LS) ratio of 0.73 (Table 3). Individuals with shorter stature and lower US: LS ratio had an earlier onset of presbyopia, whereas taller individuals exhibited an increased frequency of glasses replacement.

Table 3: Distribution of Patients by Anthropometric Parameters

Parameter	Mean/Range
Mean Height (cm)	161.59
Mean Arm Length (cm)	59.67
Mean US: LS Ratio	0.73

Regarding the frequency of glasses changes, 77.2% of patients aged 40–49 years replaced their glasses once,

while 22.2% required a second replacement. Among those aged 50–59 years, 13% needed three or more changes (Table 4).

Table 4: Frequency of Change of Glasses

Frequency of Change	Age Group	Frequency (%)
Once	40–49 years	77.2
Twice	40–49 years	22.2
Thrice	50–59 years	13

Certain factors contributed to both early onset and increased frequency of presbyopic correction. Occupations requiring near work, shorter stature, lower US: LS ratio and hypermetropia were associated with an earlier need for presbyopic glasses (Table 5). Taller individuals, hypermetropes, and frequent VDU users exhibited a higher frequency of spectacle replacements (Table 6).

Table 5: Factors Contributing to the early need for presbyopic correction

Factor	Contribution to Early Correction (%)
Occupations	Near Work: 40-49 years (21.7%)
Height	<155 cm: <40 years (146-155 cm)
US: LS Ratio	Lower Ratio: <40 years (0.7–0.79)
Refractive Error	Hypermetropia: <40 years

Table 6: Factors contributing to increased frequency of change of glasses

Factors	Contribution to Increased Frequency (%)
Occupations	Near Work: 40–49 years
Height	Taller: 166–175 cm
US: LS Ratio	Lower Ratio: All Age Groups
Refractive Error	Hypermetropia: All Age Groups
Visual Display Unit Usage	Increased Usage: All Age Groups

DISCUSSION

Our study comprehensively explored presbyopia, a common age-related visual impairment affecting near vision. Examining 600 patients, we sought to unravel the complexities surrounding its prevalence, onset, and influencing factors.

Our findings revealed a notable prevalence of uncorrected presbyopia at 30% among the study cohort. What particularly caught our attention was the unexpected gender distribution, with a higher prevalence observed among males, comprising 59% of the cases, contrary to prior research trends [13,14]. This intriguing discrepancy prompts further investigation into potential underlying reasons for such gender-based differences in presbyopia prevalence.

Delving deeper into age distribution, we observed a striking pattern with the highest prevalence of presbyopia occurring in the 40–49 years age group, encompassing 53% of the patients. This observation aligns with established literature, indicating a pivotal stage in the progression of presbyopia during middle adulthood. However, the presence of premature presbyopia in 6% of individuals below 40 years challenges conventional notions of presbyopia as solely an age-related condition, urging us to explore alternative factors contributing to its early onset [15,16]. Approximately half of presbyopia patients, notably in developing regions, go untreated. Those with uncorrected presbyopia face twice the difficulty with near-vision tasks and over eight times the challenge with demanding near-vision tasks compared to individuals under 40 years old [17].

Occupational influences emerged as a significant determinant in the onset and progression of presbyopia. Notably, occupations demanding extensive near work, such as tailors, teachers, drivers, and engineers, exhibited an early need for presbyopic correction, particularly in the 40–49 years age group. This underscores the profound impact of occupational demands on visual health and underscores the necessity for tailored interventions catering to individuals engaged in such professions [18-20].

Moreover, our study unveiled novel insights into the role of anthropometric parameters in presbyopia onset. We observed that individuals with shorter stature (<155 cm) demonstrated an early need for presbyopic correction, while increased arm length was associated with delayed

onset. This intriguing finding sheds light on the intricate interplay between physical attributes and ocular health, warranting further exploration into the underlying mechanisms driving these associations [21-23].

Furthermore, our investigation into lifestyle factors revealed intriguing observations. Contrary to expectations, substance abuse, including tobacco and alcohol consumption, did not significantly influence the age of presbyopic correction. However, individuals with a history of visual display unit (VDU) usage exhibited a higher frequency of glasses changes, indicating a potential correlation between increased screen time and visual health deterioration.

SUMMARY

In summary, our study provides valuable insights into the multifaceted nature of presbyopia, encompassing diverse factors ranging from demographic characteristics to occupational demands and lifestyle behaviors. These findings not only enrich our understanding of presbyopia but also highlight the need for targeted interventions aimed at optimizing visual health across diverse populations.

CONCLUSIONS

In conclusion, the need for presbyopic correction before the age of 49 is influenced by several factors. Occupations involving extensive near work, shorter stature, lower upper segment to lower segment (US: LS) ratio and hypermetropia contribute to the premature onset of presbyopia. Additionally, individuals in occupations requiring prolonged near work, those of normal to a taller height, with a lower US: LS ratio, hypermetropia, and frequent use of visual display units are more likely to experience a higher frequency of changes in glasses prescription. Understanding these factors is essential for devising targeted strategies to address presbyopia-related challenges and optimize visual outcomes for affected individuals in this age group.

CONTRIBUTION OF AUTHORS

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REFERENCES

- [1] Nirmalan PK, Krishnaiah S, Shamanna BR, Rao GN, Thomas R. A population-based assessment of presbyopia in the state of Andhra Pradesh, South India: The Andhra Pradesh eye disease study. *Invest Ophthalmol Vis Sci.*, 2006; 47: 2324-48.
- [2] Mancil GL, Bailey IL, Brookman KE, Campbell BJ, Cho MH, et al. Care of the patient with presbyopia, optometric clinical practice guidelines. *Am Optom Assoc.*, 2006; 1: 3-5.
- [3] Khalaj M, Gasemi H, Barikani A, Ebrahimi M, Rastak S. Prevalence of presbyopia among smoking population. *J Eye Ophthalmol.*, 2014; 1: 1.
- [4] Fasih U, Rais M, Rahman A, Shaikh A, Fahmi MS. Early presbyopia a psychosomatic disorder. *Pak J Ophthalmol.*, 2014; 30: 30.
- [5] Priyambada S. Premature presbyopia and its risk factors—a hospital-based study. *Int J Contemp Med Res.*, 2019; 6: C1-C4.
- [6] Sheeladevi S, Seelam B, Nukella PB, Borah RR, Ali R, et al. Prevalence of refractive errors, uncorrected refractive error, and presbyopia in adults in India: A systematic review. *Indian J Ophthalmol.*, 2019; 67: 583-92.
- [7] Mishra D, Bhushan P, Singh MK, Makkar B, Sinha BP, et al. Prospective clinical study to find out epidemiology of presbyopia in a pre-presbyopic population (age group 34–40 years). *J Clin Ophthalmol Res.*, 2019; 7: 51-53.
- [8] Burke AG, Patel I, Munoz B, Kayongoya A, McHiwa W, et al. Prevalence of presbyopia in rural Tanzania: a population-based study. *Ophthalmol.*, 2006; 113: 723-27.
- [9] Kamali A, Whitworth JA, Ruberantwari A, Mulwanyani F, Acakara M, et al. Causes and prevalence of non-vision impairing ocular conditions among a rural adult population in SW Uganda. *Ophthalmic Epidemiol.*, 1999; 6: 41-48.
- [10] Mornny FK. Correlation between presbyopia, age, and number of births of mothers in the Kumasi area of Ghana. *Ophthalmic Physiol Opt.*, 1995; 15: 463-66.
- [11] Duarte WR, Barros AJ, Dias-da-Costa JS, Cattán JM. Prevalence of near vision deficiency and related factors: a population-based study. *Cad Saude Publica.*, 2003; 19: 551-59.
- [12] Muhammad N, Adamu MD, Maishanu NM, Samaila E, et al. Prevalence of presbyopia and spectacle correction coverage in a rural population of North West Nigeria. *Clin Ophthalmol.*, 2015; 9: 1195-201.
- [13] Hofstetter HW. Further data on presbyopia in different ethnic groups. *Am J Optom Arch Am Acad Optom.*, 1968; 45: 522-27.
- [14] Charman WN. Age, lens elasticity, and accommodative loss. *Ophthalmic Physiol Opt.*, 2008; 28: 1-17.
- [15] Pointer JS. The presbyopic add, II. Age-related trend and a gender difference. *Ophthalmic Physiol Opt.*, 1995; 15: 241-48.
- [16] Weale RA. Epidemiology of refractive errors and presbyopia. *Surv Ophthalmol.*, 2003; 48: 515-43.
- [17] Fricke TR, Tahhan N, Resnikoff S, Papas E, Burnett A, et al. Global prevalence of presbyopia and vision impairment from uncorrected presbyopia: systematic review, meta-analysis, and modelling. *Ophthalmol.*, 2018; 125: 1492-99.
- [18] Holden BA, Fricke TR, Ho SM, Wong R, Schlenker G, et al. Global vision impairment due to uncorrected presbyopia. *Arch Ophthalmol.*, 2008; 126: 1731-39.
- [19] Patel I, Munoz B, Burke AG, Kayongoya A, McHiwa W, et al. Impact of presbyopia on quality of life in a rural African setting. *Ophthalmol.*, 2006; 113: 728-34.
- [20] Nochez Y, Levecq L, Majzoub S, Pisella PJ. Effects of aging on visual performances and on the focusing mechanism in presbyopia. *J Fr Ophtalmol.*, 2010; 33: 598-605.

- [21]Rozema JJ, Atchison DA, Tassignon MJ. Comparing methods to estimate the human lens power. *Invest Ophthalmol Vis Sci.*, 2011; 52: 7937-42.doi: 10.1167/iops.11-7899.
- [22]Anderson HA, Hentz G, Glasser A, Stuebing KK, et al. Minus-lens–stimulated accommodative amplitude decreases sigmoidally with age: a study of objectively measured accommodative amplitudes from age 3. *Invest Ophthalmol Vis Sci.*, 2008; 49(7): 2919-26.
- [23]Wolffsohn JS, Davies LN. Presbyopia: effectiveness of correction strategies. *Prog Retin Eye Res.*, 2019; 68: 124-43.

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